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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
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| 10/707,369 | 12/09/2003 | Madhusudhana T. Subraya | GEMS 0234 PA (130123 CIP) | 1368 |
| 27256 | 7590 | 10/03/2005 | EXAMINER | |
| ARTZ & ARTZ, P.C. 28333 TELEGRAPH RD. SUITE 250 SOUTHFIELD, MI 48034 | | | SONG, HOON K | |
| | | | ART UNIT | PAPER NUMBER |
| | | | 2882 | |

DATE MAILED: 10/03/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/707,369

Applicant(s)

SUBRAYA ET AL.

Examiner

Hoon Song

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 18 July 2005.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☐ Claim(s) 1-9 and 13-29 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 1-8, 28 and 29 is/are allowed.
- 6) ☐ Claim(s) 9 and 13-27 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 09 December 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____

DETAILED ACTION

Terminal Disclaimer

The terminal disclaimer filed on 3/30/2005 disclaiming the terminal portion of any patent granted on this application which would extend beyond the expiration date of US 6301332B1 has been reviewed and is accepted. The terminal disclaimer has been recorded.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 9, 13-17, 21-22 and 27 are rejected under 35 U.S.C. 102(b) as being anticipated by Rogers et al. (US 6215852B1).

Regarding claims 9, Rogers teaches an x-ray tube window cooling assembly for an x-ray tube comprising at least one electron collector body (88) coupled to an x-ray tube window (102) and comprising a cavity (coolant channel) at least partially filled with a body formed of a phase change material (coolant fluid 110 is considered a phase change material) in which a coolant circulates therethrough (figure 4).

Regarding claim 13, Roger teaches said at least one electron collector body (88) is formed of a conductive metallic material.

Regarding claim 14, Roger teaches said at least one electron collector body is formed of copper (column 8 line 33).

Regarding claim 15, Roger teaches said at least one electron collector body comprises a first electron collector body and a second electron collector body (figure 4).

Regarding claims 16, Roger teaches said first electron collector body is coupled to a first side of said x-ray tube window (the body extending left from the window) and said second electron collector body is coupled to a second said of said x-ray tube window (the body extending right from the window) (figure 4).

Regarding claims 17, Roger teaches said at least one electron collector body is formed at least partially of a phase change material (column 9 line 12) .

Regarding claim 21, Roger teaches at least a portion (124) of said at least one thermal exchange resides within a cavity of said at least one electron collector body.

Regarding claim 22, Roger teaches said at least one thermal exchange device comprises at least one plenum (cooling channel).

Regarding claim 27, Roger teaches said at least one thermal exchange device comprise: a first thermal exchange device (housing) and a second thermal exchange device (coolant) embedded in said first thermal exchange device (housing)

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 23-24 are rejected under 35 U.S.C. 103(a) as being unpatentable over Roger in view of Lu et al. (US 6430263B1).

Regarding claims 23-24, Roger fails to teach the plenum is divided uniformly by at least one fin.

Lu teaches a plenum divided uniformly by at least one fin (42) (figure 3).

It would have been obvious to one of ordinary skill in the art at the time of the invention to adapt the cooling circuit of Rogers with the fins as taught by Lu, since the fins would further improve cooling efficiency.

Claim 25 is rejected under 35 U.S.C. 103(a) as being unpatentable over Roger in view of Marechal et al. (US 6390187B1).

Regarding claim 25, Roger fails to teach said at least one thermal exchange device have a diameter that is less than or equal to approximately 3 mm.

Marechal teaches a heat exchanger having diameter of 1-4 mm (column 4 line 15).

It would have been obvious to one of ordinary skill in the art at the time of the invention to provide the heat exchanger of Roger with the heat changer having the diameter as taught by Marechal, since the diameter of Marechal would maximize the heat transfer.

Allowable Subject Matter

Claims 1-8 and 28-29 are allowed over prior art.

The following is a statement of reasons for the indication of allowable subject matter:

Regarding claims 1, 6-7 and 28-29, the prior art fails to teach an electron collector body having at least one coolant circuit and thermally couple to an x-ray tube

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wherein the collector body has a significantly large surface area that is disposed over and is approximately parallel with a target surface area, and is oriented to receive a significant amount of back-scattered electrons as claimed in independent claim 1.

Regarding claim 2, the prior art fails to teach a first electron collector body and a second electron collector body non-integrally formed each other and thermally coupled to an x-ray tube window and each having at least one coolant circuit with a coolant inlet and a coolant outlet and at least one thermal exchange device coupled to said at least one coolant circuit and reducing temperature of a coolant passing through said at least one thermal exchange device as claimed in independent claim 2.

Regarding claim 3, Roger fails to teach the at least one thermal exchange device is contained within said at least one electron collector body as claimed in claim 3.

Regarding claims 4 and 8, Roger fails to teach the at least one thermal exchange device comprises a finless porous body as claimed in claims 4 and 8.

Regarding claim 5, Roger fails to teach a cavity and the at least one thermal exchange device formed at least partially of a phase change material and substantially filling said cavity as claimed in claim 5.

Response to Arguments

Applicant's arguments with respect to claims 9 and 13-27 have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP

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§ 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Hoon Song whose telephone number is (571) 272-2494. The examiner can normally be reached on 8:30 AM - 5 PM, Monday - Friday.


If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Edward Glick can be reached on (571) 272 - 2490. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

HKS

9/28/05
HKS


DAVID V. BRUCE
PRIMARY EXAMINER